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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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EXAMINER	
TRAN, KHANH C	

ART UNIT	PAPER NUMBER
2631	

DATE MAILED: 01/18/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/814,590	GARG ET AL.	
	Examiner	Art Unit	
	Khanh Tran	2631	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *28 September 2004*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-6,8-16 and 18-20* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☒ Claim(s) *1-6 and 8-10* is/are allowed.

6)☒ Claim(s) *11-14 and 18* is/are rejected.

7)☒ Claim(s) *15,16,19 and 20* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *22 July 2004* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

1. The Amendment filed on 09/28/2004 has been entered. Claims 1-6, 8-16 and 18-20 are pending in this Office action.

Response to Arguments

2. The amendments to the specification on page 2 of the "Reply To Office Action" has been accepted and entered.

3. The objection of claims 9 and 19 has been withdrawn after claims are amended to correct the informalities.

4. Applicant's arguments, see page 8 of the Remarks, filed on 09/28/2004, with respect to claims 1-2, 5, 11-12, and 15-16 under the judicially created doctrine of obviousness-type double patenting have been fully considered and are persuasive. The rejection of claims 1-2, 5, 11-12, and 15-16 has been withdrawn after Applicants file a terminal disclaimer.

5. Applicant's arguments with respect to claims 11-14 have been considered but are moot in view of the new ground(s) of rejection.

Claim Objections

6. Claim 19 is objected to because of the following informalities: in line 3, "baud rate" should be changed to -- rate --; in line 3, "Mbaud baud rate" should be changed to -- Mbaud rate --. Appropriate correction is required.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

7. Claims 11-14 and 18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Koslov et al. U.S. Patent 5,978,420 in view of Miller et al. U.S. Patent 5,621,762 and Meyer U.S. Patent 6,317,468 B1.

Regarding claim 11, Koslov et al. invention is for implementing and controlling digital filters suitable for use in modulators. As shown in figure 4, see column 4 line 51 through column 5 line 38, Koslov et al. discloses a modulator 100 including:

- a symbol mapping circuit 102, wherein the mapping circuit 102 generates in-phase (I) and quadrature (Q) phase signals. The in-phase (I) and quadrature (Q) phase signals are representative of the claimed first data signal. Koslov et al. does not disclose the in-phase (I) and quadrature (Q) phase signals are generated at selected one of a plurality

of baud rates. However, the generation of the in-phase (I) and quadrature (Q) phase signals is at a predetermined baud rate as appreciated by one of ordinary skill in the art;

- a complex mixer 106 for mixing the in-phase (I) and quadrature (Q) phase signals to generate frequency shifted data signals;
- an interpolator 115 for increasing the frequency of the frequency shifted data signals;
- a bandpass filter 117 for filtering the frequency shifted data signals to generate a digital representation of the modulated carrier signal.

Koslov et al. does not disclose that the in-phase (I) and quadrature (Q) phase signals are scaled by one of a plurality of predetermined scaler values to correspond to the baud rate to generate a scaled signal.

As shown in figure 3, Miller et al. discloses a communication device 300 including a digital modulator 301, see figure 4. In column 4 lines 45-64, the digital modulator 301 comprises a symbol mapper 404 for generating In-phase (I) and Quadrature (Q) components. The I and Q components are then dynamically scaled via the symbol scaling portion 406 of the peak suppression algorithm block 402. The scaling of the I and Q components of the data symbols is in anticipation of the filtering action that takes place via pulse shape filter 408. By scaling the I and Q components of the data symbols, the magnitude of the signal peaks is minimized, thereby reducing the peak power demand. Miller et al. teaches, in the same field of endeavor, the application of scaling the I and Q

components generated by symbol mapper 404 before the filtering action taken. Because the act of scaling the I and Q components of the data symbols reduces the magnitude of the signal peaks, thereby reducing the peak power demand, it would have been obvious for one of ordinary skill in the art at the time the invention was made that Koslo et al. modulator 10 can be modified to include the symbol scaling portion 406 of the peak suppression algorithm block 402 as taught by Miller et al.. Furthermore, since scaling the I and Q components to minimize the magnitude of the signal peaks, the selected scaling value would correspond to the baud rate generated by the symbol mapper as appreciated by one of ordinary skill in the art.

Referring of Koslov et al. invention, figure 6 illustrates an implementation of the interpolation circuit 200 including a series of L interpolation stages. In column 6 line 65 through column 7 line 15, Koslov et al. expresses that by changing coefficient filter values from filter to filter, a single filter design can be used for all of the filters 206, 212, 222. In view of that, the interpolation circuit 200 uses a set of predetermined filter coefficients for each of the I-channel and the Q-channel as appreciated by one of ordinary skill in the art.

Koslov et al. does not teach the interpolation circuit 200 implemented as a finite impulse response (FIR) filter. Meyer discloses a method for modulating an intermediate frequency of a radio frequency transmitter with a digital sample stream. Figure 2 shows digital finite impulse response (FIR) interpolation filters 30, 32 are utilized for interpolating the samples to a much higher sample rate.

Since digital filtering operation is often implemented as an FIR because of filter design simplicity, one of ordinary skill in the art would have been motivated to implement Koslov et al. interpolation circuit 200 as an FIR filter.

The modification of Koslov et al. interpolation circuit 200 addresses the claimed step of "*filtering the frequency shifted scaled data signal includes finite impulse response filtering utilizing a set of predetermined filter coefficients for each of the I-channel and the Q-channel*".

Regarding claim 12, as discussed in claim 11, the in-phase (I) and quadrature (Q) phase signals, generated by symbol mapper 102 as taught by Koslov et al. are representative of the first data signal as claimed in the pending application. The scaling as taught by Miller et al. scales the I and Q components. The complex mixer in Koslov et al. invention performs the mixing on the I and Q components.

Regarding claim 13, Koslov et al. and Miller et al. do not disclose mapper generating data signal with sampling frequency corresponding to the highest baud rate as claimed in the pending application. Because transmission of data is normally at highest throughput as possible, one of ordinary skill in the art would have been motivated to generate I and Q components at sampling frequency corresponding to the highest baud rate.

Regarding claim 14, as expressly disclosed by Miller et al., see column 4 lines 45-64, the scaling of the I and Q components of data symbols aim at minimizing the magnitude of the signal peaks, hence reducing the peak power demand on the amplifier. In view of that, the scaling only affects the amplitude of scaled signal, and is independent of the baud rate. As known in the art of data transmission, the transmitter maintains the transmitted signal at some optimum constant level, therefore, it would have been obvious for one of ordinary skill in the art that the scaling values of the peak suppression algorithm can be selected in such a way that each of scaling values would provide for the I and Q components to have approximately the same signal strength.

Regarding claim 18, Koslov et al. does not specifically teach the baud rates and sampling rate as claimed in the instant application. However, Koslov et al. invention is directed to an interpolation technique used to convert a low rate digital signal to a high rate signal and to shift the carrier to a desired frequency. Because Koslov et al. teachings apply to a plurality of rates, one of ordinary skill in the art will recognize that the plurality of baud rates 2 Mbaud and 4 Mbaud as claimed in the instant application are within the scope of Koslov et al. teachings. Regarding to the claimed sampling frequency of 4 Mhz, Koslov et al. teachings are an improvement over prior art, wherein the modulator of figure 3 utilizes sampling frequency, e.g. 5-40 Hz, see column 1 line 65 to column 2 line 5. Because the claimed sampling rate is nearly overlapped with the recited range of sampling frequency, one of ordinary skill in the art will recognize that the claimed sampling frequency is within the scope of Koslov et al. teachings.

Allowable Subject Matter

8. Claim 1-6 and 8-10 are allowed.

The following is a statement of reasons for the indication of allowable subject matter:

Regarding claim 1, claim 1 is allowed after being amended to include allowable features. The cited prior art of record (US 5,978,410 and 5,621,762), taken individually or in combination fails to particularly a device for modulating a carrier signal comprising uniquely distinct features "*wherein the pulse shaper circuit includes a finite impulse response filter and a coefficient matrix storing a set of coefficients for each of the I-channel and the Q-channel*".

9. Claims 15-16 and 19-20 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Conclusion

10. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Khanh Tran whose telephone number is 571-272-3007. The examiner can normally be reached on Monday - Friday from 08:00 AM - 05:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Mohammad Ghayour can be reached on 571-272-3021. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

KCT

Khanhcong Tran 01/14/2005

Examiner KHANH TRAN